Example #4:

a) **Calculate the impulse suffered by a 105 kg man who lands on firm ground after jumping from a height of 1.5 m.**

b) **What force would be exerted on the man if he bent his knees and absorbed the fall in 0.40 s?**

a) → use kinematics to find impact speed with the ground:

$$v_f^2 = \cancel{v_i^2}^{0} + 2ad$$

$$v_f = \sqrt{2(-9.8)(-1.5)} = 5.42 \text{ m/s}$$

note! initial speed of impulse delivered by the ground.

$$\Delta p = m(v_F - v_i)$$

$$= 105(0 - 5.42)$$

$$\boxed{\Delta p = -5.7 \times 10^2 \ \frac{\text{kg}\cdot\text{m}}{\text{s}}}$$

b) $\Delta p = Ft$

$$-569 = F(.40)$$

$$\boxed{F = -1.4 \times 10^3 \text{ N}}$$